Technology Opportunity

Advanced Workstation Clustering

New techniques for distributed computing and experimental parallel processing have produced an information resource that may be of use to the general business community. The National Aeronautics and SpaceAdministration (NASA) seeks to make these findings readily available.

Potential Commercial Uses

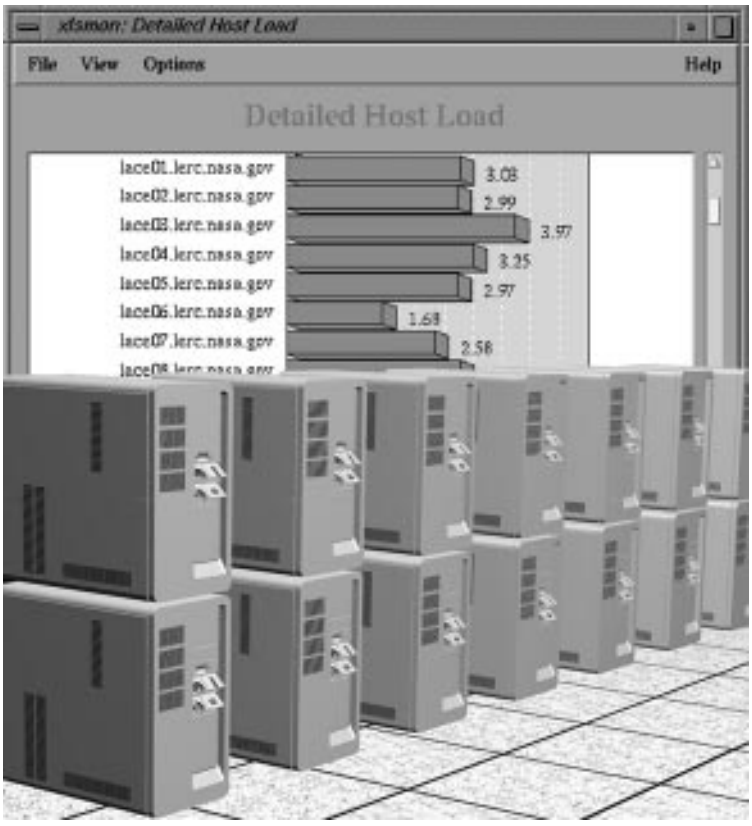
- Computing platform alternatives to supercomputers and mainframes
- Method to solve larger problems by utilizing the combined resources of multiple workstations
- Economical environments for parallel computing

Benefits

- Utilize unused computer time on existing workstations and personal computers
- Provide affordable alternative to buying supercomputer hardware or computing time
- Reduce reliance on specialized hardware or software

The Technology

The Advanced Computational Concepts Laboratory (ACCL) at the NASA Lewis Research Center is demonstrating the practicality of workstation clusters as a viable alternative to supercomputers at a fraction



The ACCL LACE (Lewis Advanced Computational Environment) Cluster.

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of the cost. Using low-cost computing hardware and both public domain and commercial software, workstation clusters can solve, at a reduced cost, most computational problems that currently run on CRAY–class supercomputers and mainframes.

A cluster is a group of workstations, either isolated in a machine room or located on desktops, from vendors such as IBM, Sun Microsystems, Hewlett-Packard, and Silicon Graphics, connected with a LAN (local area network). A distributed-job scheduler is used to balance the computational load across these systems. Such a scheduler enables programs to be run overnight on desktop machines that otherwise would sit idle. NASA Lewis researchers have used this technology to move aeronautical codes such as APNASA and ALLSPD-3D from traditional mainframe computers to a cost-effective distributed workstation environment.

Many computationally intensive problems can be broken up into smaller units that can be solved simultaneously. Algorithms for these problems can be designed to run in parallel on multiple processors using standards such as Message Passing Interface (MPI). These parallel codes, along with traditional single processor programs, can be managed by modern distributed scheduling systems.

Advances in clustering technology have enabled around-the-clock utilization of our cluster, which demonstrates the commercial viability of such technology.

Options for Commercialization

The technology needed to develop and maintain production clusters is currently available from commercial and public domain sources. Parties interested in setting up their own distributed computer environment can obtain information from the Advanced Computational Concepts Laboratory staff.

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